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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/582,099	03/19/2007	Osamu Kanome	03500.103394.	1165

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EXAMINER	
LAM, ANN Y	

ART UNIT	PAPER NUMBER
1641	

MAIL DATE	DELIVERY MODE
11/13/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/582,099	KANOME ET AL.	
	Examiner	Art Unit	
	ANN Y. LAM	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,5,7-11 and 13* is/are rejected.

7)☒ Claim(s) *3,6 and 12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :9/25/07, 4/12/07, 3/19/07, 12/4/06.

DETAILED ACTION

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 2 and 3. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4, 5 and 7-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Bridgham et al., 5,750,346.

Bridgham et al. disclose a capture system that may comprise a plurality of incubation chambers 50, each chamber enclosing a single anchor site 10 in a liquid occlusive manner. The incubation chambers 50 may be used to provide for the growth of captured cells and/or performing biochemical reactions on polynucleotides derived from the captured cells or the progeny of the captured cells. Embodiments of the host organism capture systems of the invention may also comprise a cover plate 40. The cover plate 40 may comprise a plurality of capture regions 60 in register with the incubation chambers 50. The capture regions 60 may be cell capture regions formed of binding pair moieties that are members of binding pairs complementary to binding pair members expressed on the surface of cells of interest. In other embodiments of the host organism capture system, capture regions may be located on the walls of the incubation chambers 50. Column 6, lines 13-34.

The choice of a particular binding pair is a strong function of the host organism being used. Such binding pairs may be chosen generally among ligand/receptor pairs, antigen/antibody pairs, biotin/avidin pairs, metalchelator pairs, carbohydrate/ lectin pairs, and any other like binding pairs. Column 15, lines 5-9.

A particularly preferred binding pair useful in E. coli-based systems relies on the interaction of type 1 fimbriae of E. coli and bovine ribonuclease B

(RNAse B). The fact that type 1 fimbriae exhibit high affinity for D-mannosyl residues suggested the use of bovine ribonuclease B as the complementary member of the binding pair. The well known ability of RNAse B to stick to hydrophobic substrates such as glass and polystyrene suggested that suitably patterned substrates with adsorbed RNAse B could be used to capture single E. coli cells). It will be appreciated by those skilled in the art, that mannose containing glycoproteins in addition to ribonuclease B, as well as mannosyl containing carbohydrates, may be used to bind type 1 fimbriae (or other mannose binding proteins).

Column 15, lines 21-53.

In an embodiment, the immobilized binding moiety is attached to the solid support at a plurality of discrete anchor sites, where, as used herein, the term "anchor site" refers to a location on the solid substrate having one or more binding moieties attached thereto such that there is an essentially binding-moiety-free region separating each anchor site. Such attachment may be based on covalent attachment or physical adsorption, e.g., hydrophobic adsorption or charged-based adsorption. The solid substrate comprising one or more binding moieties is referred to as an "anchor site array." Preferably, each anchor site has dimensions such that only a single host organism can bind to a single anchor site. Column 16, lines 32-52.

The host organism capture systems of the invention may be adapted for carrying out numerous molecular biology processes in addition to the capture of single cells at the anchor sites. Such processes include cell growth, ordered

host cell library formation, polynucleotide capture, polynucleotide amplification, capture of polynucleotide amplification products, DNA sequencing , and the like. By combining one or more of such processes with single cell capture, the system may be used to reduce the number of manipulations required for the analysis. Column 17, lines 34-49.

Embodiments of the capture system further may comprise one or more capture regions 60 for each incubation chamber unit. The term "incubation chamber unit" is used to indicate a portion of the host organism capture system that consist of a single incubation chamber 50, the portion of the anchor site array 5 surrounded by the output port of the incubation chamber, and any region of a cover plate 40 (optionally present) surrounded by the input port 25 of the incubation chamber 50. Capture regions 60 are discrete portions of an incubation chamber unit that comprises a moiety that is member of a specific binding pair and is immobilized at one or more site on each incubation chamber unit. Capture regions 60 may be cell capture regions, non-specific polynucleotide capture regions, or sequence-specific polynucleotide capture regions, as determined by the specific binding moiety selected for the capture region 60. Column 18, lines 51-67.

Cell capture regions are capture regions 60 designed for the binding of binding moieties that are differentially expressed on the surface cells of interest. Preferably, the binding moieties of the cell capture regions are the same as the binding moieties of the anchor sites 10. The binding moieties of the cell capture regions may be immobilized by the same methods used to immobilize binding moieties to anchor sites 10. Cell capture regions are at least the same size, and preferably larger than

anchor sites 10. Capture regions 60 that are larger than anchor sites 10 may be used to bind a plurality of cells differentially expressing the moiety of interest, whereas anchor regions 10 are designed to capture single cells. In a preferred embodiment of the invention, the host cell capture region comprises a plurality of cell capture regions, each region located on the bottom surface of a cover plate 40 and in register with the anchor sites 5. Cell capture regions may also be located on the chamber walls 30 of the incubation chambers 50.

Column 19, lines 1-17.

In another embodiment of the subject methods of analyzing individual cells of interest, the method further comprises the step propagating the individual cells that are bound to the anchor site 10 on the anchor site arrays 5. The bound cells may be propagated by adding suitable growth medium to the incubation chambers 50 and incubating the host cell capture device at suitable temperature for a period of time sufficient to produce the desires amount of progeny cells. The progeny cells may then be bound at secondary cell capture sites located on the bottom surface of the cover plate 40 or located on the chamber walls 30. Column 21, lines 20-30.

Thus, as to claim 1, the capture system is equivalent to the claimed cell culture substrate. The area on a portion of the wall of the chamber is equivalent to the claimed area for holding a biologically active substance having a biological activity to the cell [e.g., binding to the cell]. An area on another portion of the wall of the chamber, or alternatively, on the cover plate, is equivalent to the claimed area for immobilizing a biologically active substance having a biological activity to the cell [e.g., binding to the

cell.] It is noted that the chamber is suitable for culturing of the cells as discussed above.

As to claim 2, as discussed above, there is a plurality of binding partners for capturing the cells on the wall or cover plate of the chamber.

As to claim 4, Figure 13 shows a cross section of an incubation chamber 50 having four different capture regions 60 [plural units] (column 7, lines 23-24.)

As to claim 5, a combination of different biologically active substances May be used [figure 13 and column 7, lines 23-24; and column 19, lines 1-17; and see also column 15, lines 21-53.)

As to claim 7, the chamber 50 is equivalent to a recess on a surface of the substrate.

As to claim 8, the chamber is surrounded by walls, as discussed above.

As to claim 9, the surface treatment with an organosilane to facilitate attaching of a binding moiety (column 17, lines 15-33) is equivalent to a supporting layer provided on the surface of the substrate on which the biologically active substance is immobilized.

As to claim 10, the wall or a lower portion of the wall with immobilized binding moiety is equivalent to the claimed holding area at a heighter from a lower end of the culture area.

As to claim 11, the captures regions 60 in figure 13 show holding areas in positions different in distances from a lower end of the culture area.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 7, 8, 10, 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chetverin, 6,322,971, in view of Bridgham et al., 5,750,346, and further in view of Holtlund et al., 20040161368.

Chetverin discloses a support having an array of depressions or wells 62, each containing an immobilized oligonucleotide 64. Well 62 formed in support 60 has therein oligonucleotide 64 covalently bound to support 60 by covalent linking moiety 66. Oligonucleotides can be immobilized on the inner surface of the walls of the lattice, rather than on the bottoms of the wells. Column 10, lines 14-55.

As to claims 1, 7, 8, 10 and 11, the support is equivalent to the claimed cell culture substrate. The area on a portion of the wall of the well is equivalent to the claimed area for holding a biologically active substance. An area on another portion of the wall of the well is equivalent to the claimed area for immobilizing a biologically active substance.

However, Chetverin does not disclose that the biologically active substance has biological activity to the cell. Such capture and assaying of cells on walls of a chamber

is disclosed by Chetverin (column 19, lines 1-17). The skilled artisan would have recognized that wells, such as the Chetverin, can be used for capture and assay of materials, including cells, as suggested by Bridgham et al., and thus such use is within the skill of the ordinary artisan.

As to claim 13, an inclined wall as claimed is not disclosed by Chetverin. However, providing the Chetverin well such that it includes an inclined wall, forming a tapered well, is within the skills of the ordinary artisan, as such a configuration of an assay well is well known in the arts, as shown by Holtlund et al. in paragraph 0027.

Allowable Subject Matter

Claims 3, 6 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANN Y. LAM whose telephone number is (571)272-0822. The examiner can normally be reached on Mon.-Thurs. 9-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Shibuya can be reached on 571-272-0806. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ann Y. Lam/
Primary Examiner, Art Unit 1641